

Amendments to the Claims:

This listing of the claims will replace all prior versions, and listings, of the claims in the application:

1 1. (Original) In a remote data mirroring arrangement of data storage systems, a  
2 method of connecting ports on a data storage system to ports on other data storage systems  
3 comprising:  
4 providing each storage system with configuration topology information;  
5 determining from a switch fabric that connects to ports of all of the data storage  
6 systems information identifying ports of the other data storage systems connected to the  
7 switch fabric; and  
8 using the configuration topology information and the information obtained from the  
9 switch fabric to establish a logical link between a port on the storage system and a second  
10 port on a second storage system so that data residing on a device group supported by the port  
11 and a corresponding, mirrored device group supported by the second port can be exchanged  
12 between the data storage system and the second data storage system.

1 2. (Original) The method of claim 1, wherein the configuration topology  
2 information comprises configuration topology tables.

1 3. (Original) The method of claim 2, wherein the configuration topology tables  
2 further comprise a device groups table identifying the device groups supported by the data  
3 storage system and providing for each of the device groups a pointer to one of the other data  
4 storage systems that serves the device group.

1 4. (Original) The method of claim 3, wherein the configuration topology tables  
2 further comprise a remote systems table specifying by serial number each one of the other  
3 data storage systems that is pointed to by the pointer in the device groups table.

1 5. (Original) The method of claim 4, wherein the configuration topology tables  
2 further comprise a processors table identifying by a unique name each processor in the data  
3 storage system and providing an associated pointer to any one or more of the device groups  
4 supported by such processor.

1 6. (Original) The method of claim 5, wherein determining comprises:  
2 receiving from the switch fabric a list of the ports of the other data storage systems,  
3 the list including for each of the ports a corresponding World Wide Name, the World Wide  
4 Name including unique names for processors and a serial number for the data storage system  
5 with which the port is associated.

1 7. (Original) The method of claim 6, wherein using comprises:  
2 determining if any of the device groups are served by the World Wide Name.

1 8. (Original) The method of claim 7, wherein using further comprises:  
2 determining if a serial number of one of the storage systems pointed to by any of the  
3 device groups matches the serial number included in the World Wide Name;  
4 if a match exists, reading the unique processor name that is associated with the  
5 pointer that points to the matched device group; and  
6 writing to a new link entry in a link table pointers to the unique processor name and  
7 the device group as well as a state value of one.

1 9. (Original) The method of claim 8, wherein using further comprises:  
2 performing a single link discovery for the port and the port having the World Wide  
3 Name.

1 10. (Original) The method of claim 9, wherein the ports are state machines and  
2 wherein the single link discovery establishes the logical link when each of the state machines  
3 advances to a '0xFF' state from a '1' state.

1 11. (Original) The method of claim 10, wherein performing the single link discovery  
2 comprises exchanging between the ports data from the respective configuration topology  
3 tables of the ports to determine if the data matches.

1 12. (Original) The method of claim 1, wherein the switch fabric comprises a Fibre  
2 Channel switch fabric.

1 13. (Original) A system comprising:  
2 an arrangement of storage systems each adapted to control at least one group of  
3 devices that are supported in a mirrored configuration with a corresponding group of devices  
4 controlled by one of the other storage systems;  
5 for each device group and corresponding device group, first ports associated with the  
6 device group and second ports associated with the corresponding device group; and  
7 a switch element adapted to connect one of the first ports to at least one of the second  
8 ports so that data may be exchanged between the first and second ports for each device group  
9 and corresponding device group.

1 14. (Currently Amended) In a remote, mirrored arrangement of data storage systems, a  
2 data storage system comprising:  
3 a port adapted to control ~~at least~~ more than one device group;  
4 a switch element coupled to the port and ports in the other storage systems; and  
5 \_\_\_\_\_ wherein the port uses the switch element to link the port to a selected one or more of  
6 the ports controlling ~~a second device groups~~ that mirrors the more than one device group  
7 controlled by the port.

1 15. (Previously Presented) In a remote data mirroring arrangement of data storage  
2 systems, an apparatus for connecting ports on a data storage system to ports on other data  
3 storage systems comprising:

4 means for providing each storage system with configuration topology information:

5 means for determining from a switch fabric that connects to ports of all the data  
6 storage systems information identifying ports of the other data storage systems connected to  
7 the switch fabric; and

8 means for using the configuration topology information and the information obtained  
9 from the switch fabric to establish a logical link between a port on the storage system and a  
10 second port on a second storage system so that data residing on a device group supported by  
11 the port and a corresponding, mirrored device group supported by the second port can be  
12 exchanged between the data storage system and the second data storage system.

1 16. (Previously Presented) The apparatus of claim 15, wherein the configuration  
2 topology information comprises configuration topology tables.

1 17. (Previously Presented) The apparatus of claim 16, wherein the configuration  
2 topology tables further comprise a device groups table identifying the device groups  
3 supported by the data storage system and providing for each of the device groups a pointer to  
4 one of the other data storage systems that serves the device group.

1 18. (Previously Presented) The apparatus of claim 17, wherein the configuration  
2 topology tables further comprise a remote systems table specifying by serial number each  
3 one of the other data storage systems that is pointed to by the pointer in the device groups  
4 table.

1 19. (Previously Presented) The apparatus of claim 18, wherein the configuration  
2 topology tables further comprise a processors table identifying by a unique name each  
3 processor in the data storage system and providing an associated pointed to any one or more  
4 of the device groups supported by such processor.

1 20. (Currently Amended) The apparatus of claim 19, wherein the means for determining  
2 comprises:

3 means for receiving from the switch fabric a list of the ports of the other data storage  
4 systems, the list including for each of the ports a corresponding World Wide Name, the  
5 World Wide Name including unique names for processors and a serial number for the data  
6 storage system with which the port is associated. ~~the World Wide Name including unique~~  
7 ~~names for processors and a serial number for the data storage system with which the port is~~  
8 ~~associated.~~

1 21. (Previously Presented) The apparatus of claim 20, wherein the means for using  
2 comprises:

3 means for determining if any of the device groups are served by the World Wide  
4 Name.

1 22. (Previously Presented) The apparatus of claim 21, wherein the means for using  
2 further comprises:

3 means for determining if a serial number of one of the storage systems pointed to by  
4 any of the device groups matches the serial number included in the World Wide Name:

5 means for reading the unique processor name that is associated with the pointer that  
6 points to the matched device group; and

7 means for writing to a new link entry in a link table pointers to the unique processor  
8 name and the device group as well as the state value of one.

1 23. (Previously Presented) The apparatus of claim 22, wherein the means for using  
 2 further comprises:  
 3 means for performing a single link discovery for the port and the port having the  
 4 World Wide Name.

1 24. (Previously Presented) The apparatus of claim 23, wherein the ports are state  
 2 machines and wherein the single link discovery establishes the logical link when each of the  
 3 state machines advances to a '0xFF' state from a '1' state.

1 25. (Previously Presented) The apparatus of claim 24, wherein means for performing the  
 2 single link discovery comprises means for exchanging between the ports data from the  
 3 respective configuration topology tables of the ports to determine if the data matches.

1 26. (Previously Presented) The apparatus of claim 15, wherein the switch fabric  
 2 comprises a Fibre Channel switch fabric.

1 27. (Previously Presented) A system comprising:  
 2 an arrangement of storage systems each adapted to control at least one group of  
 3 devices that are supported in a mirrored configuration with a corresponding group of devices  
 4 controlled by one of the other storage systems:  
 5 for each device group and corresponding device group, first ports associated with the  
 6 device group and second ports associated with the corresponding device group; and  
 7 one of the first ports being connected to at least one of the second ports so that data  
 8 may be exchanged between the first and second ports for each device group and  
 9 corresponding device group.

1 28. (Previously Presented) In a remote, mirrored arrangement of data storage systems, a  
 2 data storage systems comprising:

3 a port adapted to control at least one device group:  
4 the port being further adapted to connect to ports in the other data storage systems via  
5 a switch element; and  
6 the port being configured to use the switch element to link the port to a selected one  
7 of the ports controlling a second device group that mirrors the device group controlled by the  
8 port.

1 29. (Previously Presented) In a remote data mirroring arrangement of data storage  
2 systems, a methods of connecting ports on a data storage system to ports on other data  
3 storage systems comprising:  
4 associating ports with a group of devices that are supported in a mirrored  
5 configuration with a corresponding group of devices with which ports on one of the other  
6 data storage systems are associated; and  
7 connecting on of the ports associated with the device group to at least one of the ports  
8 associated with the corresponding device group so that data may be exchanged between the  
9 ports associated with the device group and corresponding device group.

1 30. (Currently Amended) In a remote data mirroring arrangement of data storage  
2 systems, a method of connecting ports on a data storage system to ports on other data storage  
3 systems comprising:  
4 configuring a port to control more than onea device group; and  
5 linking the port to a selected one or more of the ports controlling a second device  
6 groups that mirrors the more than one device group controlled by the port.